

## Claims

1. A process for producing polymer foams which are based on reactive polycondensation resins and have a number average pore diameter of not more than 1  $\mu\text{m}$  by gel formation, which comprises the following steps:
- 1) preparing a gelable mixture of the reactive polycondensation resin in a solvent or dispersion medium,
- 2) preparing an aqueous dispersion comprising polymer particles,
- 3) mixing the mixture of the reactive polycondensation resin from step 1) with the dispersion comprising polymer particles from step 2) to give a water-containing gel, and
- 4) drying the water-containing gel to give the polymer foam,
- with drying in step 4) being carried out at a pressure and a temperature which are below the critical pressure and below the critical temperature of the liquid phase of the gel and
- the gel not being brought into contact with an organic liquid to replace the water present in the gel by this liquid after step 3) and before step 4).
2. The process according to claim 1, wherein the polymer particles have a mean diameter of from 20 to 500 nm.
3. The process according to claim 1 or 2, wherein the reactive polycondensation resin is an amino resin.
4. The process according to any of claims 1 to 3, wherein the amino resin is a melamine-formaldehyde resin.
5. The process according to any of claims 1 to 4, wherein the polymer particles comprise polymers based on monomers selected from among styrene, butadiene, alkyl acrylates and alkyl methacrylates.
6. The process according to any of claims 1 to 5, wherein the dispersion from step 2) comprises an ionic or nonionic surfactant.
7. The process according to any of claims 1 to 6, wherein the gel obtained in step 3) is subjected to aging before step 4).

8. The process according to any of claims 1 to 7, wherein the reactive polycondensation resin and the polymer particles are mixed with one another in a mixing ratio of from 10:1 to 1:10, disregarding water and other solvents or dispersion media, in step 3).
9. The process according to any of claim 1 to 8, wherein drying in step 4) is carried out at a pressure of from 0.5 to 2 bar and a temperature of from 0 to 100°C.
10. The process according to any of claims 1 to 9, wherein the polymer foam has a porosity of at least 70% by volume.
11. A polymer foam obtainable by the process according to any of claims 1 to 10.